

Adaptation

Adaptation can be seen to be intrinsic to the survival of any organism. Indeed arguably adaptation can be read as the primary logic that underpins life itself. The natural world has evolved and survived as a result of adaptation. We can see adaptation at work in microorganisms, as flu viruses adapt to vaccines. We can see adaptation at work in creatures – most notably creatures such as the chameleon or the mimic octopus – as they physically adapt to their environment. We can see adaptation at work in nature on a large scale, in the complex adaptive systems of aggregations of individual agents, such as in the swarm behaviors of flocks of birds or schools of fish. And we can see adaptation at work in human beings. Indeed – according to some theoretical perspectives – human beings are constantly evolving psychic entities that are continually absorbing external impulses. Human beings should therefore be understood as mutant creatures, continually adapting and mutating as part of the natural struggle for survival.

This raises an interesting question about architecture. If human beings are constantly evolving, mutant creatures, what role does adaptation play in architecture? Clearly we can detect two related forms of adaptation between human beings and their buildings, whereby buildings have evolved in response to impulses of human beings, and human beings themselves have been conditioned by their environment. As Winston Churchill once said, 'We shape our buildings, and afterwards our buildings shape us'.¹

Indeed the history of architecture can be read as a history of the relationship of human beings to their buildings. Attempts to relate the proportions of buildings to the proportions of the human figure – from Vitruvius and before, through to Le Corbusier and other more recent architects – is part and parcel of this history. And beyond straightforward proportions there have been other attempts to relate the form of buildings to the physiognomy of the human form, as in the inscription of traces of human features into architectural designs of Michelangelo and others.² From antiquity onwards, the incessant urge to embody the human into architectural design – either through a deep relationality based on shared proportional logics or through the incorporation of aspects of the human figure in building forms – points towards this need to identify with buildings.

But what exactly underpins this urge for human beings relate to their buildings? Why would architects seek to produce buildings that relate to the human body? Any attempt to relate the form of a building to the form of a human must emanate from some deeper psychological desire to establish a perceived connection between human beings and their environment. This article explores this psychological desire in relation to

¹ <http://www.winstonchurchill.org/learn/speeches/quotations>, accessed 4/09/2013

² Here we might also cite the famous image of the architects' fancy dress party in the 'Fête Moderne' ball that Rem Koolhaas includes in *Delirious New York*, where William van Allen, dressed up as his design for the Chrysler Building, clearly wins the contest (Pencil Points, February 1931, p. 145, quoted in Rem Koolhaas, *Delirious New York* [New York: 010 Publishers, 1994], p. 129. This scene has been reevoked recently in Vanity Fair, with images of Michael Graves and Peter Eisenman impersonating their buildings (Mary McLeod, "Everyday and 'Other' Spaces," in Debra Coleman, Elizabeth Danze, and Carol Henderson (eds.), *Architecture and Feminism* [Princeton: Princeton Architectural Press, 1996], p. 26). See also Louis Hellman's *Archi-têtes*, where architects are portrayed in sketches composed of elements of their own projects, to illustrate this desire (Louis Hellman, *Archi-têtes* (London: Academy, 2000))

the adaptation between human beings and their physical environment in terms of two kinds of adaptation – ‘autoplastic adaptation’ and ‘alloplastic adaptation’. It outlines the urge for human beings to adapt to the physical environment around them, and *vice versa*, and then asks whether the growing potential for buildings to adapt to their users might point towards an important psychological role for interactive architecture.

Autoplastic Adaptation

‘Autoplastic’ adaptation is a psychological term developed by Sigmund Freud, Sandor Ferenczi, Franz Alexander and others. ‘Autoplastic’ adaptation refers to attempts on the part of the subject to adapt to the external environment, when faced with a difficult situation.

An obvious example of autoplastic adaptation happens in a prison, where inmates adapt psychologically to their environment – and even derive comfort from that environment, no matter how inhospitable it might be – much as victims of kidnapping can develop ‘Stockholm Syndrome’ and form a bond with their captors. In Alcatraz Penitentiary, for example, there is the example of one inmate, Leon ‘Whitey’ Thompson, who began to bond with his cell so closely, that he felt that he became part of it, as much as it became part of him, and he began to develop a relationship with it: ‘I knew every mark, every thing in that cell. And pretty soon that cell became like part of me or I became a part of the cell. I couldn’t visualize living anywhere else in the prison than in my cell. It was like coming back and greeting an old friend really, because it was part of me.’³ Equally there is the famous story of Nelson Mandela who – after his release from Paarl Open Prison in South Africa – commissioned an architect to design him a replica of the bungalow in which he had been kept under arrest, on the basis – presumably – that he had grown to feel at home in that environment.⁴ Such incidents seem to manifest extreme examples of the human desire to either find a familiar space for a home or to familiarize themselves with the unfamiliar.

Of course we can cite frequent examples of ‘memes’ within culture where physical resemblance can spread by a logic of copying – whether it be through fashion, catchy tunes or simple verbal expressions.⁵ But it is interesting to see what lies behind this urge to blend in and conform to the behaviors of others from a psychological perspective.

The book *Camouflage* traces out a line of enquiry that looked beyond the physical resemblance of human beings to their buildings, and charts an alternative approach that interrogates the psychological urge to

³ Leon “Whitey” Thompson, Alcatraz Cellhouse, audio tour produced by the Golden Gate National Park Association.

⁴ See Neil Leach, *Camouflage*, Camb., MA: MIT Press, 2006, p. 5.

⁵ See Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1989), p. 192.

assimilate and adapt to one's environment.⁶ The central theory in this research was the theory of *mimesis*. Here *mimesis* is understood not in terms of standard 'imitation', as used by thinkers, such as Plato – a process that inferred an allegiance to an originary model that infers that the original is always superior to any imitation of it. Rather *mimesis* should be perceived as a creative act of assimilation, where an individual can approximate him or herself to a given model, by incrementally approximating him or herself to that model, so as to assimilate to it without ever become identical with it.⁷

Mimesis is a psychological term, emanating from observations of Freud about the process by which we can identify with other people.⁸ Walter Benjamin and Theodor Adorno then develop it as an aesthetic concept that can be used to explain how human beings identify with the world around them. Benjamin, for example, uses it to explain how children can identify with their surroundings during a game of 'hide-and-seek' to such an extent that they need to utter a shriek of self-deliverance in order to escape from being trapped forever in their hiding place:

'Standing behind the doorway curtain, the child becomes himself something floating and white, a ghost. The dining table under which he is crouching turns him into the wooden idol in a temple whose four pillars are the carved legs. And behind a door he is himself a door, wears it as his heavy mask and as a shaman will bewitch all those who unsuspectingly enter. At no cost must he be found. When he pulls faces, he is told, the clock need only strike and he will remain so. The element of truth in this he finds out in his hiding place. Any- one who discovers him can petrify him as an idol under the table, weave him forever as a ghost into the curtain, banish him for life into the heavy door. And so, at the seeker's touch he drives out with a loud cry the demon who has transformed him—indeed, without waiting for the moment of discovery, he grabs the hunter with a shout of self-deliverance.²³

Benjamin sees *mimesis* as operating *ideationally* through the medium of words, but these words open up the possibility of an identification with physical objects such as furniture and even buildings:

"In time I learned to disguise myself in words, which were actually clouds. For the gift of seeing likeness is

⁶ Neil Leach, *Camouflage*, Camb., MA: MIT Press, 2006

⁷ Such an approach, of course, is in direct opposition to the work of certain ontological or phenomenological thinkers, such as Martin Heidegger, for whom the world is largely already formed, and for whom the creative work of art is simply a 'revealing' of that already existing truth. Not only does the theory of *mimesis* challenge such an approach that valorizes the existing – by allowing for the creative potential for *mimesis* to actually improve upon the original model – but it also challenges the 'given' nature of the world as assumed by Heidegger. The concept of *mimesis*, then, can be understood as an overcoming of the limitations of Heideggerian thought. It argues that the world is continually in flux, and any framework that assumes a static outlook on existence is necessarily at fault in that it fails to account for the capacity for all kinds of life forms to adapt as a necessary precondition of survival.

⁸ In his *Book of Jokes*, Freud describes the process of empathizing with the subject of a joke – for example, with someone slipping over a banana skin: 'When, now, I perceive a movement like this of greater or lesser size in someone else, the surest way to an understanding (an apperception) of it will be for me to carry it out by imitation. . . . But actually I do not carry the imitation through, any more than I still spell words out if I learnt to read by spelling. Instead of imitating the movement with my muscles, I have an idea of it through the medium of my memory traces of expenditures of similar movements (Sigmund Freud, *Jokes and Their Relation to the Unconscious* (1905), trans. James Strachey (London: Routledge, 1960), pp. 191-2). Crucially then it is through our memories of the slipperiness of banana skins and the process of slipping that we can put ourselves in the position of that person, and empathize with their predicament, while always maintaining a critical distance that allows us to laugh at that individual. Freud observes that the principle might be useful in understanding aesthetics: "I believe that if ideational mimetics are followed up, they may be as useful in other branches of aesthetics . . ." Freud, *Jokes*, p. 193

nothing but a weak vestige of the old compulsion to become and act like something else. But words exercised this coercion on me. Not those that made me resemble models of good behavior, but those that made me like dwellings, furniture, clothing.”⁹

The term is then picked up by Adorno who goes on to explore its potential of relating to the physical environment through a more visceral form of identification:

‘According to Freud, symbolic intention quickly allies itself to technical forms, like the airplane, and according to contemporary American research in mass psychology, even to the car. Thus, purposeful forms are the language of their own purposes. By means of the mimetic impulse, the living being equates himself with objects in his surroundings.’¹⁰

Importantly, for Adorno, *mimesis* operates as a form of ‘sensuous correspondence’ between the individual and the environment, and we must therefore distinguish between forms that have the capacity to induce that correspondence and those that do not that that capacity. As such, it is clear that *mimesis* infers a degree of aesthetic relationality that depends on the sensuousness of the design itself. The message is simple: there is an underlying desire in human beings to relate to their environment, and if we are to produce an environment that is able to foster our relationship with that environment, it needs to be sensuously designed.

The term, *mimesis*, therefore opens up a way of understanding how human beings begin to equate themselves with their environment, but also how they come to absorb external forms into the designs of buildings, so that others can relate to them:

‘It is through the mimetic impulse that human beings absorb external forms, incorporate them symbolically into their self-expression, and then rearticulate them in the objects they produce. . . Architecture, along with the other visual arts, can therefore be viewed as a potential reservoir for the operation of *mimesis*. In the very design of buildings, the architect may articulate the relational correspondence with the world that is embodied in the concept of *mimesis*. These forms may be interpreted in a similar fashion by those who experience those buildings, in that the mechanism by which we begin to feel at home in the built environment can also be seen as a mimetic one.’¹¹

Alloplastic Adaptation

Alongside ‘autoplastic adaptation’, Freud, Ferenczi and Alexander also develop the notion of ‘alloplastic

⁹ Benjamin, “A Berlin Childhood,” in *Reflections*, p. 417, as quoted in Shierry Weber Nicholsen, *Exact Imagination, Late Work: On Adorno’s Aesthetic* (Cambridge, MA: MIT Press, 1997) p. 143.

¹⁰ Theodor W. Adorno, “Functionalism Today,” in Neil Leach (ed.), *Rethinking Architecture* (London: Routledge, 1997), p. 10.

adaptation'. Whereas autoplasmic adaptation refers to the urge on the part of the subject to adapt the self to the environment, alloplasmic architecture refers to the urge on the part of the subject to make the environment adapt to the self – again when faced with a difficult situation.

We might therefore also consider the capacity of humans to make their environment adapt to them, as a necessary extension and corollary of the logic of *mimesis* – the capacity of human beings to adapt to their environment. These two logics can be seen within a dialectical framework as the opposite of each other. Yet both logics depend upon adaptation – the adaptation of the self to the environment, and the adaptation of the environment to the self – and both effect a form of identification. For any form of identification to take place there must be some form of equivalence – between one animate object and another, or one inanimate and another.:

'One of the assumptions in the identificatory moment of assimilation is that, as animate creatures, we can somehow equate ourselves with our inanimate architectural surroundings. This introduces a distinction between life and death, animate and inanimate. Either we "play dead," and become inanimate like our surroundings, or we animate those surroundings, and make them like ourselves. These processes may be interpreted through the discourse of psychoanalysis, for which the life and death instincts remain fundamental impulses. It is the distinction between Medusa, who turned everything that met her gaze to stone, and Daedalus, who reputedly had the capacity to bring statues to life.'¹²

We might therefore posit two dialectically related logics:

1. The urge for animate humans to become inanimate like the inanimate world of buildings around us.
2. The urge for animate humans to 'animate' the inanimate world of buildings.

Indeed this reciprocal process of adaptation is already hinted at by Michael Taussig, who describes *mimesis* as "the art of becoming, of becoming other."¹³ The theory of *mimesis* therefore invites comparison with the concept of 'becoming', as championed by Gilles Deleuze and Felix Guattari. The most notable example of 'becoming' offered by Deleuze and Guattari, is perhaps that between a wasp and an orchid. Here the orchid entices the wasp through its nectar, and the wasp is thereby coopted into helping to cross-pollinate the orchid.¹⁴ This is an example of co-adaptation, whereby the wasp has adapted to the orchid, no less than the orchid has adapted to the wasp. Wasp and orchid serve each other's mutual interests.

¹¹ Leach, *Camouflage*, p. 45.

¹² Leach, *Camouflage*, p. 168.

¹³ Michael Taussig, *Mimesis and Alterity* (London: Routledge, 1993), p. 36.

¹⁴ In *Camouflage* the assumption is made, however, that the wasp being referred to is the Digger Wasp (*Gorytes mystaceus* and *Gorytes campestris*) and the orchid is the fly orchid (*Ophrys insectifera*), and that there is mutual interaction is a form of pseudo-copulation, whereby the wasp is attracted not to nectar but by the simulation of sexual activity. See *Camouflage*, p. 84.

What the theory of 'becoming' begins to suggest is that alongside the potential – outlined in the theory of 'mimesis' – for humans to assimilate to their environment, there is also the potential for the environment to assimilate to the self. But how are we to understand the potential identificatory mechanisms in animating the inanimate? Indeed, how is it even possible to animate the inanimate?

In *Camouflage* the argument is made that such animation may operate solely in the mind. It follows the logic of the work of Jacques Lacan, in arguing that there is a basic form of 'animate knowledge' that structures the way that the human mind operates. For Lacan sees knowledge as grounded in a form of 'primordial anthropomorphism', and questions "whether all knowledge is not originally *knowledge of a person* before being *knowledge of an object*, and even whether the knowledge of an object is not, for humanity, a secondary acquisition."¹⁵ We can therefore recognize an animating tendency behind this anthropomorphizing urge to see things as humans before we see them as things. This could be compared to the animating desire of the paranoiac to animate the inanimate, such that walls have ears and eyes. We might therefore detect in Lacan's work a desire for what we might call 'paranoid knowledge', that could itself be compared to the creative potential of Dali's famous 'paranoid critical method':

"Paranoid knowledge" emerges out of an anthropomorphizing urge that is the foundation of all knowledge. At its most extreme, it can manifest itself in the literal anthropomorphization of building forms, as in the "paranoid critical vision" of Dalí, who sees the skyscrapers of New York come alive at sunset, "ready to perform the sexual act." In its more subtle forms, however, it simply means that we can forge attachments to buildings *as though they are human beings*.¹⁶

If the term 'paranoid knowledge' seems too extreme, an alternative term 'animate knowledge' could be adopted, a term that is stripped of the negative associations of paranoia, and yet retains the animating potential of that condition. As such, 'animate knowledge' might explain the all too common urge to anthropomorphize the external world and thereby animate the inanimate environment. It might therefore be understood as an alternative mechanism of identification between the self and the environment:

'The act of making the world like the self is equivalent to the act of making the self like the world. Both involve a play between the animate and the inanimate, and both ultimately serve the same ends. Once the inanimate world of architecture has itself been animated, identification can take place. We can therefore understand animate knowledge as the corollary to assimilation. It marks the capacity not to make the self like the other, but to make the other like the self.'¹⁷

¹⁵ Jacques Lacan, *De la psychose paranoïaque dans ses rapports avec la personnalité*, followed by *Premiers écrits sur la paranoïa* (Paris: Éditions du Seuil, 1975), p. 326, as quoted in Mikkel Borch-Jacobsen, *Lacan: The Absolute Master*, trans. Douglas Brick (Stanford, CA: Stanford University Press, 1991), p. 57.

¹⁶ Leach, *Camouflage*, p. 160.

¹⁷ *Op.cit.*

But how are we to adapt this theory in the light of recent explorations into interactive environments? For sure, it would seem that a whole new logic of animated construction has opened up recently, largely as a result of the commercial availability of devices such as sensors, Arduino control boards, Servos, smart materials, such as Shape Memory Alloys, and readily available popular devices, such as Kinect that can be re-appropriated, and used to monitor the behavior of humans in interactive installations.

What these devices offer is the possibility not only of the environment being 'imagined' as animate – as in the logic of paranoid knowledge – but of it actually becoming animate. Moreover, if we consider projects such as Behnaz Farahi's 'Alloplastic Architecture' interactive installation, we can see that the use of a dynamic tensegrity structure can 'mimic' human behavior, in that the human body itself can be seen to be a form of tensegrity structure, with bones acting as compressive members, skin and other tissues as passive tensile members, and muscles as active tensile members.

Here I want to suggest that a new chapter is opening up within the field of design that has two fundamental impacts on previously assumed givens within the world of design.

1. The introduction of activation devices that change the shape of an architectural environment – or 'animate' it to keep to our earlier language – according to the movement of the users, using a secondary series of devices that track the movement of those users, offer the potential of 'animating the inanimate' beyond the psychological tendency to perceive the inanimate world in animate terms.

2. These technological developments challenge the still popular assumptions that technology is alienating. by establishing that – far from *inducing* alienation – technology has the potential to *overcome* alienation.

But most importantly of all, perhaps, this begins to suggest that there is a significant psychological role that interactive architecture might play to undermine the potential alienation of human beings from their environment. For if we assume that the urge behind 'autoplastic adaptation' is to adapt the self to the environment – a process that will happen, as we have seen, even in extreme environments such as prisons – it is the role of design, surely, to facilitate that process. Design, in other words, can help us to feel at home in and become part of our environment. Design in this sense should be seen in static terms as the design of architectural forms. By extension, the urge behind 'alloplastic adaptation' is to make the environment adapt to the self. While some kind of fantasy of adaptation - that operates in the mind - can be promoted through the development of techniques, such as the 'paranoid critical method', as championed by Dali, true adaptation must surely depend on actual physical adaptation. Here, then, we are addressing not form but formation – the adaptation of form – and the development of a material behavior that might reflect and resemble the behaviors of the human body. If then we can devise environmental behaviors that make the subject feel more at home within a space, does it not suggest that one of the most significant contributions of interactive architecture might be not within the physical realm but the psychological realm? As such, might not the most significant potential contribution of interactive architecture be not as some form of

environmental control system – as some have supposed - but rather as a sociological mechanism that promises to create a more hospitable environment more in keeping with the human condition?

Neil Leach

Illustrations

1. Francesca Woodman [courtesy of the Francesca Woodman Estate], illustration taken from Neil Leach, *Camouflage*, Camb., MA: MIT Press, 2006; Woodman.jpg
2. Behnaz Farahi, Alloplastic Architecture, installation, tutored by Alvin Huang, Neil Leach, Michael Fox; a performance artist dances with the structure that reacts to her presence without any actual physical contact. A Kinect motion sensor device tracks the movement of the dancer, and thereby reconfigures the entire structure through the use of an Arduino control board and Shape Memory Alloy [SMA] springs; MVI_1494.MOV.Still001.bmp
3. Alloplastic Architecture; MVI_1494.MOV.Still008.bmp
4. Ferrofluid, Arusyak Manvelyan, Kate Shelegon, Alexander Amirov, tutored by Neil Leach, Alexander Kalachev, Karim Soliman; a Kinect device tracks human motion and through the use of robotic vehicles controls the patterning of ferro-fluids on a screen; pattern formation.jpg
5. Ferrofluid, kinect detector.jpg
6. Ferrofluid, final result.jpg